

§§ 193.2103–193.2117

(b) Stationary LNG storage tanks must comply with Section 7.2.2 of NFPA 59A (2006) (incorporated by reference, *see* §193.2013) for seismic design of field fabricated tanks. All other LNG storage tanks must comply with API Standard 620 (incorporated by reference, *see* §193.2013) for seismic design.

[Amdt. 193–22, 75 FR 48604, Aug. 11, 2010]

MATERIALS

§§ 193.2103–193.2117 [Reserved]

§ 193.2119 Records

Each operator shall keep a record of all materials for components, buildings, foundations, and support systems, as necessary to verify that material properties meet the requirements of this part. These records must be maintained for the life of the item concerned.

DESIGN OF COMPONENTS AND BUILDINGS

§§ 193.2121–193.2153 [Reserved]

IMPOUNDMENT DESIGN AND CAPACITY

§ 193.2155 Structural requirements.

(a) The structural members of an impoundment system must be designed and constructed to prevent impairment of the system's performance reliability and structural integrity as a result of the following:

- (1) The imposed loading from—
 - (i) Full hydrostatic head of impounded LNG;
 - (ii) Hydrodynamic action, including the effect of any material injected into the system for spill control;
 - (iii) The impingement of the trajectory of an LNG jet discharged at any predictable angle; and
 - (iv) Anticipated hydraulic forces from a credible opening in the component or item served, assuming that the discharge pressure equals design pressure.

(2) The erosive action from a spill, including jetting of spilling LNG, and any other anticipated erosive action including surface water runoff, ice formation, dislodgement of ice formation, and snow removal.

(3) The effect of the temperature, any thermal gradient, and any other antici-

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pated degradation resulting from sudden or localized contact with LNG.

(4) Exposure to fire from impounded LNG or from sources other than impounded LNG.

(5) If applicable, the potential impact and loading on the dike due to—

(i) Collapse of the component or item served or adjacent components; and

(ii) If the LNG facility adjoins the right-of-way of any highway or railroad, collision by or explosion of a train, tank car, or tank truck that could reasonably be expected to cause the most severe loading.

(b) An LNG storage tank must not be located within a horizontal distance of one mile (1.6 km) from the ends, or $\frac{1}{4}$ mile (0.4 km) from the nearest point of a runway, whichever is longer. The height of LNG structures in the vicinity of an airport must also comply with Federal Aviation Administration requirements in 14 CFR Section 1.1.

[45 FR 9203, Feb. 11, 1980, as amended by Amdt. 193–17, 65 FR 10959, Mar. 1, 2000]

§§ 193.2157–193.2159 [Reserved]

§ 193.2161 Dikes, general.

An outer wall of a component served by an impounding system may not be used as a dike unless the outer wall is constructed of concrete.

[Amdt. 193–17, 65 FR 10959, Mar. 1, 2000]

§§ 193.2163–193.2165 [Reserved]

§ 193.2167 Covered systems.

A covered impounding system is prohibited except for concrete wall designed tanks where the concrete wall is an outer wall serving as a dike.

[Amdt. 193–17, 65 FR 10959, Mar. 1, 2000]

§§ 193.2169–193.2171 [Reserved]

§ 193.2173 Water removal.

(a) Impoundment areas must be constructed such that all areas drain completely to prevent water collection. Drainage pumps and piping must be provided to remove water from collecting in the impoundment area. Alternative means of draining may be acceptable subject to the Administrator's approval.

(b) The water removal system must have adequate capacity to remove water at a rate equal to 25% of the maximum predictable collection rate from a storm of 10-year frequency and 1-hour duration, and other natural causes. For rainfall amounts, operators must use the “Rainfall Frequency Atlas of the United States” published by the National Weather Service of the U.S. Department of Commerce.

(c) Sump pumps for water removal must—

(1) Be operated as necessary to keep the impounding space as dry as practical; and

(2) If sump pumps are designed for automatic operation, have redundant automatic shutdown controls to prevent operation when LNG is present.

[45 FR 9203, Feb. 11, 1980, as amended by Amdt. 193-17, 65 FR 10959, Mar. 1, 2000]

§§ 193.2175–193.2179 [Reserved]

§ 193.2181 Impoundment capacity: LNG storage tanks.

Each impounding system serving an LNG storage tank must have a minimum volumetric liquid impoundment capacity of:

(a) 110 percent of the LNG tank’s maximum liquid capacity for an impoundment serving a single tank;

(b) 100 percent of all tanks or 110 percent of the largest tank’s maximum liquid capacity, whichever is greater, for the impoundment serving more than one tank; or

(c) If the dike is designed to account for a surge in the event of catastrophic failure, then the impoundment capacity may be reduced to 100 percent in lieu of 110 percent.

[Amdt. 193-17, 65 FR 10960, Mar. 1, 2000]

§§ 193.2183–193.2185 [Reserved]

LNG STORAGE TANKS

§ 193.2187 Nonmetallic membrane liner.

A flammable nonmetallic membrane liner may not be used as an inner container in a storage tank.

[Amdt. 193-17, 65 FR 10960, Mar. 1, 2000]

§§ 193.2189–193.2233 [Reserved]

Subpart D—Construction

§ 193.2301 Scope.

Each LNG facility constructed after March 31, 2000 must comply with requirements of this part and of NFPA 59A (incorporated by reference *see* § 193.2013). In the event of a conflict between this part and NFPA 59A, this part prevails.

[Amdt. 193-17, 65 FR 10960, Mar. 1, 2000, as amended by Amdt. 193-18, 69 FR 11336, Mar. 10, 2004]

§ 193.2303 Construction acceptance.

No person may place in service any component until it passes all applicable inspections and tests prescribed by this subpart and NFPA 59A (incorporated by reference, *see* § 193.2013).

[45 FR 9203, Feb. 11, 1980, as amended by Amdt. 193-17, 65 FR 10960, Mar. 1, 2000; Amdt. 193-18, 69 FR 11337, Mar. 10, 2004]

§ 193.2304 Corrosion control overview.

(a) Subject to paragraph (b) of this section, components may not be constructed, repaired, replaced, or significantly altered until a person qualified under § 193.2707(c) reviews the applicable design drawings and materials specifications from a corrosion control viewpoint and determines that the materials involved will not impair the safety or reliability of the component or any associated components.

(b) The repair, replacement, or significant alteration of components must be reviewed only if the action to be taken—

(1) Involves a change in the original materials specified;

(2) Is due to a failure caused by corrosion; or

(3) Is occasioned by inspection revealing a significant deterioration of the component due to corrosion.

[Amdt. 193-2, 45 FR 70404, Oct. 23, 1980]

§§ 193.2305–193.2319 [Reserved]

§ 193.2321 Nondestructive tests.

(a) The butt welds in metal shells of storage tanks with internal design pressure above 15 psig must be non-destructively examined in accordance